FACTS

Ontario
Ministry of the Environment
Hon. Harry C. Parrott, D.D.S., Minister
Graham W. S. Scott, Q.C., Deputy Minister

ABOUT WATER TREATMENT PLANT OPERATION

Introduction

The Ontario Ministry of the Environment is the Ontario government agency responsible for the management of water resources throughout the Province of Ontario.

As part of the water management function, the Ministry keeps close check on the quality of all municipal water supplies, and builds and operates water treatment plants and facilities for municipalities and areas.

This Fact Sheet outlines the treatment method and equipment used to purify surface water for community use. This type of treatment is typical for larger communities. There are a number of other methods for smaller applications.

The object of treatment is to use the most effective processes and equipment for the removal of impurities inherent in a specific source, and to render the water odourless, colourless, free from undesirable chemicals and bacteriologically safe.

Intake

To obtain water from a surface source, an intake crib is built in deep water some distance from the shore. From the intake crib an intake pipe carries the water to a low lift pumping station located on the shore. Screening devices across the intake and within the low lift station prevent entry of fish and other objects. The screened water is then pumped to the treatment plant.

Microstrainer

Where there is a relatively large amount of algae in the raw water, it may be screened again. The screening unit, called a microstrainer, is a revolving drum covered on the outside with a finely woven stainless steel cloth.

The raw water enters the centre of the drum and passes out through the screen cloth, which entraps algae and other foreign materials. The strainer is continuously backwashed to remove the accumulated impurities, which are discharged to a waste hopper.

Flocculation and Sedimentation

From the microstrainer, the water flows to a large concrete tank called a "Flocculator". This is a chamber designed to allow for the intermixing of chemicals and water to coagulate the impurities contained in the water together for easy removal in the settling basin following.

The coagulating chemicals, such as alum, are added automatically by chemical feeders which operate in relation to the flow entering the flocculator. The tank contains large paddles which constantly agitate the contents to prevent settling.

From the flocculators the water passes into a sedimentation (settling) basin where it is retained for a period to allow the accumulated clusters (floc) time to settle to the bottom for removal and disposal.

Sand Filters

The partially treated water then passes into the filtering stage, which consists of gravity filters.

The filters are concrete tanks into which have been placed straining systems, called the filtering "media". The media consist of layers of finely graded sand or anthracite coal over layers of graded gravel which rest upon an underdrain system of perforated pipes.

In the filtering operation, the partially treated water flows over the top of the filter media and passes down through to the underdrains and

out into a clear water reservoir. Impurities contained in the water are trapped in the media.

Periodically, the filters are taken out of service and backwashed by forcing clean water up through the media at a high rate. The accumulated impurities are scoured out from within the sand layer into wash water troughs and discharged to a waste sewer.

Chlorination

The purified water accumulates in a clear water reservoir where it is chlorinated to ensure complete disinfection before discharge to the community.

The chlorine is fed automatically in proportion to the flow entering the reservoir.

Laboratory Facility

It is vital that a constant check be kept on the quality of the water in process and leaving the plant.

This is done by the operating staff in the plant laboratory where every aspect of treatment and final delivery is closely watched and analyzed.

This ensures the highest quality possible for delivery to the consumer.

Plant Operation

Water treatment plants, as described in this fact sheet, and smaller installations, are staffed by specialists in the field of plant operations throughout Ontario.

A visit to a local plant to see what is being done to provide safe drinking water for your community is suggested.

Additional information on the operation and maintenance of a water treatment plant may be obtained from the superintendent of the Environment Ontario or municipally operated plant in your area.

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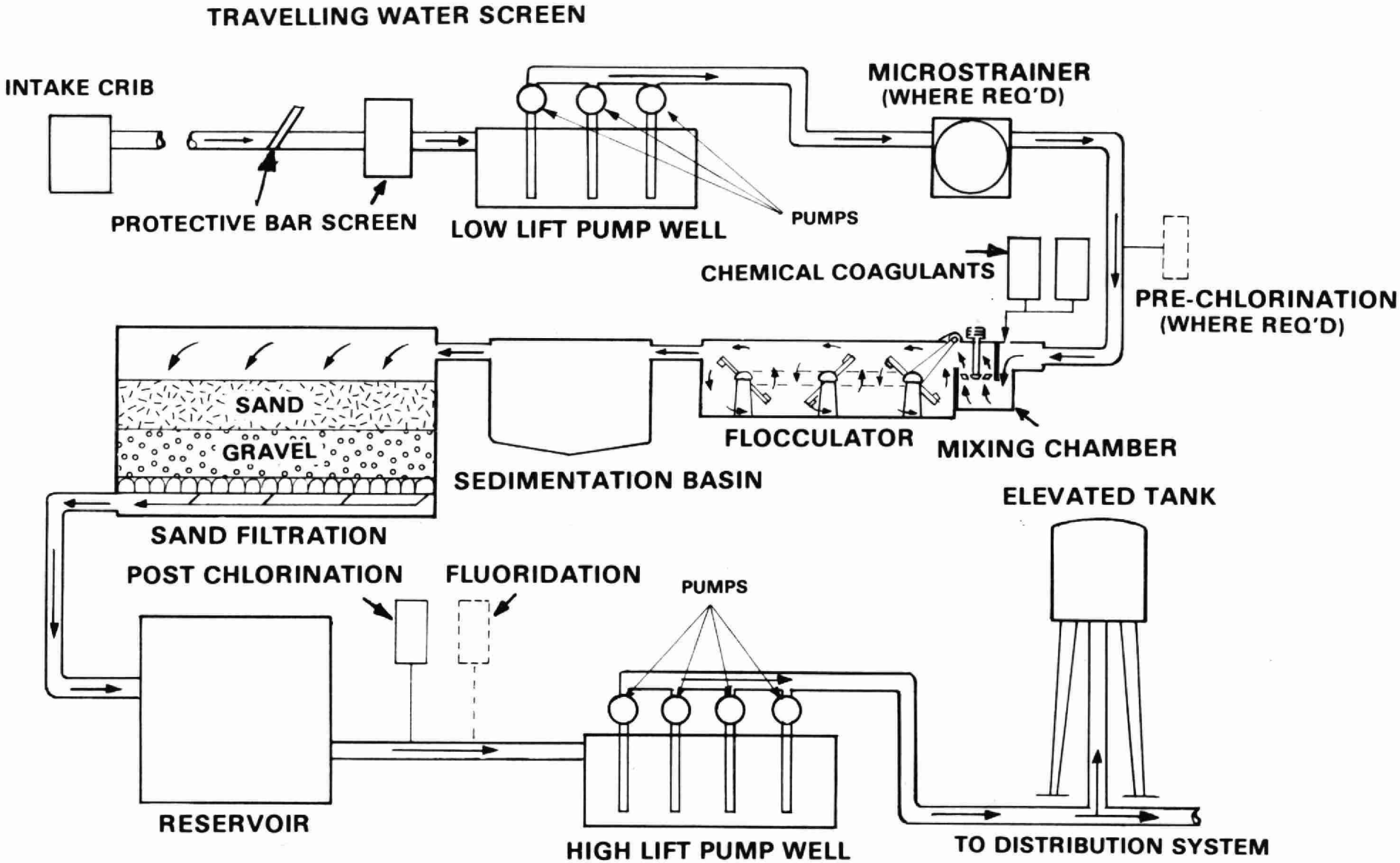
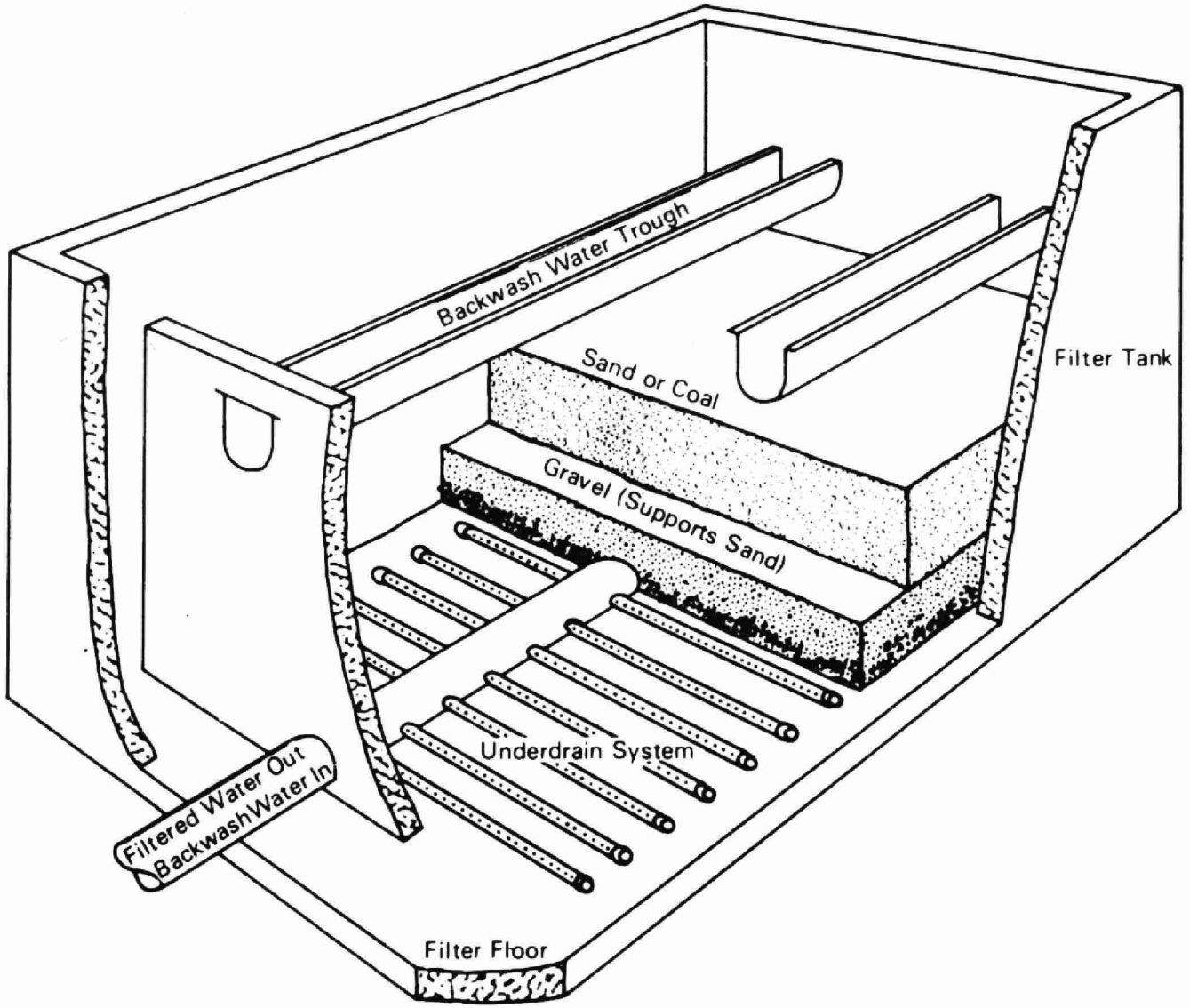
(A schematic of a typical water treatment plant and a sand filter is reproduced on pages 3 and 4.)

Tour Notes and Observations

WATER TREATMENT PLANT FLOW DIAGRAM




Backwash Water Trough
Sand or Coal
Gravel (Supports Sand)
Filter Tank
Underdrain System
Filtered Water Out
Backwash Water In
Filter Floor